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16 'Individual Failure' and a Behavioural Public Sector Economics

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16.1 Introduction

Neo-classical welfare economics is the foundation on which the positive and normative prescriptions of public sector economics are premised. Key to this foundation are the preferences and capabilities of the caricature *homo and femina economicus*. Both traditional public finance and public choice schools have focused on this 'representative' individual. Following Brennan and Lomasky (1993) this actor is described as: (i) 'rational'; (ii) egoistic; (iii) with egoism predicated on self-interest narrowly defined in terms of income or wealth. Armed with this caricature Public Sector Economics has undoubtedly made great strides in understanding 'market failure' (in the case of traditional public sector economics) and 'government failure' (in what is called the public choice approach).

What can be said about these very strong facilitating characteristics that were once viewed as harmless and obvious? A vital consideration is the meaning of 'rational' behaviour. 'Rational' behaviour is consistent behaviour. Predictions can be made when *homo and femina economicus* face new constraints (relative prices, income). If preferences are assumed exogenous and constant, predictions are premised on the response individuals make to changes in constraints (Stigler and Becker, 1977). This approach can accommodate a broader description of a 'representative' individual. Altruism and malevolence for example can be incorporated via inter-dependent utility functions but these would be seen as exceptions for the representative individual whose default mode is self-interest in all contexts. Further there is no doubt that defining self-interest narrowly as (expected) utility or wealth

maximisation makes many of the examples to be found in economics texts ‘work’ easily and seamlessly. The motivation of this chapter partly arises because this perspective, or more grandly paradigm, may have run its course in terms of the major insights that can be obtained with it and partly from an apparent strong demand for a (public sector) economics based on a more ‘real’ actor.

The focus is on economic behaviour that is predicated on a different caricature that might be dubbed *homo and femina realitus* (see Cullis and Jones, 2009) . What are the descriptive characteristics to be employed? This more recently employed actor has a number of characteristics, being reliant on:

- (i) bounded abilities that can be subdivided into: (a) bounded rationality and (b) bounded self-will;
- (ii) bounded self-interest, being concerned with more than pure self-interest narrowly defined – a ‘bigger and richer person’ than *homo economicus*. Again a sub-division may be helpful: (a) individuals have an internal moral or ethical dimension that shows up in concepts like intrinsic motivation – a desire to do ‘the right thing’ for its own sake and (b) an external dimension where they are wary if they follow their narrow self-interest that they will unjustifiably impose costs on others, or disappoint by failing to act in line with an accepted social norm;
- (iii) a preference map that is endogenous and malleable (as opposed to the traditionally assumed exogenous and fixed preferences). Here a distinction can be made by (a) looking at transient endogeneity, e.g. by emotion priming in experiments to affect results or ‘micro’ framing effects (b) focusing on more permanent endogeneity, where the actor is responsive to

public policy and other signals that affect preferences ('macro' framing effects).

The next section elaborates on the 'individual failure' comprising (i) to (iii) above.

16.2 *Homo and Femina Realitus*

Bounded abilities: (i)(a) Both 'traditional public finance' and 'public choice' schools have focused on 'rational' actors in order to predict behaviour. Becker (1971, p. 26) puts it at its starkest: "The essence of this model of rational behaviour is contained in just two assumptions: each consumer has an ordered set of preferences, and he chooses the most preferred position available to him." But, if as Hegel (cited in Knox, 1952, p. 230) profoundly observes: "The rational is the highroad where everyone travels, where no one is conspicuous", a growing literature now suggests that 'the highroad' is not sign-posted with the axioms required to underpin Becker's definition. The highroad is littered with an array of partially analyzed, yet systematic, heuristic responses and the likes of transitivity, strong separability and the usual rules for combining lotteries have to be replaced by something else. Analysis of 'rational' behaviour facilitates prediction (for economists, 'rational' is equivalent to consistent behaviour). If there are departures from 'rational' behaviour these appear to be *anomalies*. The problem is that, in experiment after experiment, and demonstration after demonstration, anomalies are seen to be ubiquitous and persistent. A very well established literature now describes such behaviour but as this behaviour departs systematically from 'rational' behaviour (of *homo economicus*), it is possible to explore the implications for analysis of public finance and public choice. Frey and Eichenberger (1994) are early authors who describe a significant body of evidence

drawn from economic psychology and experimental economics. A long list of anomalies that can be drawn up calls into question the extent to which public sector economics can be built on an analysis relying on the rationality of *homo economicus*. It implies that our new actor (*homo realitus* for short) does not have “unlimited cognitive and information processing capabilities” (Guth and Ortmann 2006, p. 405). Instead, our new ‘representative’ individual relies on *bounded rationality* (involving ‘rules of thumb’ and the like) and these should be a feature of behavioural public sector economics.

(i)(b) Bounded self-will. An early feature of behavioural economic analysis was the recognition of bounded self-will. As Oscar Wilde famously wrote in Act 1 of *Lady Windermere’s Fan* – “I can resist everything except temptation”. Individuals are tempted and are often impulsive and impatient in their choices. Shefrin and Thaler (1988) have a savings model that involves multiple selves in that the myopic ‘doer’ in you wants to bring forward all consumption whereas the far sighted ‘planner’ in you recognizes you need to save and spread consumption over all future periods especially retirement when you will not be earning. Once this feature of *homo realitus* is recognised then it becomes natural to have an analysis that involves pre-commitment devices that may be internal or external. An internal device could involve the use of ‘mental accounts’ to constrain choices, so that the ‘savings account’ cannot be raided to bolster the ‘entertainments account’ this month. Externally problem gamblers may have themselves banned from casinos, or savers sign up to pension schemes that deny any access to your savings until retirement.

(ii)(a) Internal bounded self-interest. Individuals have an ethical and moral dimension. They seem to want to do the right thing simply for its own sake – intrinsic motivation.

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In a ‘third party’ punishment game two players, the dictator A and recipient B, participate in a dictator game. There is a third player, the potential punisher C, who observes how much A gives to B; then C can spend a proportion of his endowment on punishing A. This game measures to what extent ‘impartial’ and ‘unaffected’ third parties are willing to stick up for other players at their own expense, enforcing a conventional sharing norm by punishing unfair dictators. A significant number of C players do indeed punish unfair choices by dictators – for them it is the right thing to do (see e.g. Fehr and Gächter, 2000a).

(ii)(b) External bounded self-interest. There is a vast literature predicated on the notion that individuals demonstrate concern for others in a great variety of ways – so called ‘other-regarding’ preferences. A number of utility functions have been employed to capture this concern. For example, Fehr and Schmidt (1999) have a utility function that allows individuals to feel envy and compassion:

$$U_i(x) = x_i - \alpha_i \sum_{n-1 \text{ } j \neq i} (x_j - x_i) - \beta_i \sum_{n-1 \text{ } j \neq i} (x_i - x_j) \quad (1.1)$$

so that in Equation (1.1) i’s utility depends on i’s private outcome x_i reduced by an envy term that measures the extent to which there is a set of people who are doing better than i $\sum (x_j - x_i)$ and a compassion term that measures the extent to which there is a set of people who are doing worse than i $\sum (x_i - x_j)$. The coefficient on envy, α_i , exceeds the coefficient, β_i , on compassion – no one’s perfect!

(iii)(a) Transient preference endogeneity. Lowenstein (2007) suggests economists have been good at picking up insights from cognitive psychology but have missed a

large part of what governs individual choices by ignoring emotion. The same individual in different emotional states can behave very differently, being altruistic or selfish, farsighted or myopic, risk averse or risk taking. Lerner, Small and Loewenstein (2004) illustrate the power of ‘emotional priming’ in the context of the endowment effect explored in Section 2. Christian and Alm (2014) find that experimental subjects primed to elicit empathy are more tax compliant than those who do not complete their priming task. What was dubbed ‘micro’ framing above can be related to the *reference point effect*: alternatives are evaluated by individuals not in terms of total wealth but relative to a reference point, often the status quo. ‘Framing’ moves the reference point so that lotteries with the same expected values are treated differently. Lotteries framed as losses invoke risk taking, whilst those framed as gains encourage risk averse choices.

(iii)(b) Longer term preference endogeneity. It would seem reasonable to accept that cultural, economic and social forces affect individuals’ tastes or preferences. This has far reaching consequences for economics if the test for efficiency (a Pareto optimum) is about a set of economic arrangements that conform to the preferences that, in the extreme, the economic system has itself created. In this chapter, the nature of long term preference endogeneity is more attenuated than this and will involve ‘Nudge’ type arguments, where government policy intervention may be seen as ‘shaping’ choices by exploiting what is known about individual decision making. Here it is an attempt to make preferences endogenous to policy cues to raise individuals’ long term welfare that is the core of the argument. For example, ‘opting in’ / ‘opting out’ policy frames that invoke ‘status quo’ bias seem to make individuals choose to be in a works pension scheme or not.

The upshot of this discussion is that in a behavioural public sector economics the analysis is likely to be more ‘messy’ than a neoclassical approach and involve: the use of heuristics; framing; mental accounts; pre-commitment devices; exploitation of anomalous choices; intrinsic motivation and forms of ‘other regarding’ preferences.

How sensitive is public finance and public choice analysis to changes in the description of a ‘representative’ individual and implied internal and external environments is explored below?

16.3 Insights from Behavioural Economics: Implications for Public Expenditure Appraisal

Cost-benefit analysis (CBA) is premised on the neoclassical assumptions that representative individuals are rational and self-interested. However, if insights (i) to (iii) are relevant, is it possible to rely on CBA to appraise public expenditure projects? CBA assesses the welfare implications of projects with reference to individuals’ preferences. If the net present value of a project is positive, the implication is that ‘willingness to pay’ for the project (on the part of the gainers) exceeds ‘willingness to pay’ not to have the project (on the part of the losers); the project is ‘efficient’.¹ But, with evidence of bounded rationality, bounded will power and bounded self-interest, can cost-benefit analysis be premised on individuals’ preferences?

16.3.1 Valuations of Costs and Benefits

Should valuations be based on ‘willingness to pay’ (WTP)? It is also possible to rely on ‘willingness to accept’ (WTA). WTA is a measure of the compensation required in the absence of the project, to make an individual feel as well off as if the

¹ Willingness to pay not to have the project is a measure of the opportunity cost of resources.

individual had received the net benefits of the project. In neoclassical economics, estimates of WTP differ from estimates of WTA when individuals experience 'income effects' (as a consequence of receipt of the net benefits of expenditure on the project), but the presumption is that differences between valuations based on WTP and on WTA can be ignored because income effects are not expected to be significant (Willig, 1976).

With bounded rationality, individuals are sensitive to framing effects and to reference points. Differences between valuations premised on WTP and valuations premised on WTA are far greater than anticipated.

- (i) Differences are far greater in experiments. Kahneman et al. (1990) focused on the valuations of 44 undergraduate students in Cornell. 22 students were given Cornell coffee mugs (which sold at \$6.00 at the bookstore). The subjects who did not receive a mug were asked to indicate the prices they would be 'willing to pay' for a mug. Those who received a mug were asked to indicate the prices they would be 'willing to accept' to sell their mug. As the mugs were distributed randomly, the expectation was that there would be no difference in the tastes of the 22 subjects that received the mug and the tastes of those who did not. The expectation was that approximately 11 mugs would be sold. Only 3 mugs were sold. WTA was far higher than WTP.
- (ii) Differences are far greater in cost-benefit studies. Table 1 highlights some illustrative examples (in studies that value environmental assets and activities). The differences are vivid in the ratios of WTA to WTP.

Table 1: Willingness to Pay (WTP) and Willingness to Accept (WTA) in Cost-Benefit Studies (in \$)

<i>Study and Entitlement</i>	<i>Means</i>			<i>Medians</i>		
	<i>WTP</i>	<i>WTA</i>	<i>Ratio</i>	<i>WTP</i>	<i>WTA</i>	<i>Ratio</i>
HYPOTHETICAL SURVEYS						
Hammack and Brown (1974) Marshes	247	1,044	4.2	NA	NA	NA
Banford <i>et al.</i> (1979) Fishing Pier	43	120	2.8	47	129	2.7
Postal Service	22	93	4.2	22	106	4.8
Bishop and Heberlein (1979) Goose-hunting permits	21	101	4.8	NA	NA	NA
Heberlein and Bishop (1985) Deer hunting	31	513	16.5	NA	NA	NA

Source: Adapted from Kahneman et al. (1990).

In the experiment described in (i), recipients of mugs acted as if they incorporated their mug into their *status quo* wealth (Kahneman et al., 1990). With loss aversion, they judged the loss of a mug more seriously than the money that would be paid for the mug. In experiments and in cost-benefit studies, valuations appear to be influenced by an *endowment effect*. Of course, there are other possible explanations. In neoclassical economics, Hanneman (1991) has shown that WTP may diverge significantly from WTA when focusing on a public good (if there are no private goods that are good substitutes for the public good). In behavioural economics, ‘anchoring’ and ‘mental accounting’ might also be relevant.²

With all of these qualifications, valuations depend on reference points. Cost-benefit analysis is likely to underestimate costs when valuations are premised on

² With ‘anchoring’, responses may be sensitive to valuations suggested in questionnaires. With ‘mental accounting’, individuals might state an amount drawn from the mental account that they assign for expenditure on conservation, when they are asked how much they would be willing to pay to prevent the extermination of a particular species. They may then state a much higher amount (with no overall constraint) when they are asked how much they would require to accept this outcome.

willingness to pay. Compensations for losses (in court cases) may fail to fully indemnify individuals when they are based on willingness to pay (Knetsch, 1990). When undertaking cost-benefit analysis, valuations depend on whether individuals view changes (i) with reference to their present status, or (ii) with reference to their status if the proposed changes are to be accepted (Knetsch, 2010).

16.3.2 Discounting Future Costs and Benefits

Neoclassical textbooks suggest that it is 'rational' to discount future gains and losses continuously and exponentially, and to rely on a single discount rate (e.g. Mishan and Quah, 2007).³ With evidence that individuals rely on bounded self-will, individuals' time preferences appear to be quite different. How relevant are these insights when focusing on: (i) the *way* individuals discount future costs and benefits and (ii) the *rate* at which individuals discount future costs and benefits?

In cost-benefit analysis, costs and benefits are discounted by a discount factor $1/(1 + r)^t$ (where t is a unit of time). This is exponential because the time path of the discount factor follows an exponential function of the form e^{-rt} (where r is the discount rate and t is a unit of time). With a constant discount rate, only the absolute difference between measures of value (V) matters. For example, if benefit V_a (due next year) is preferred to benefit V_b (in three years), the ranking should be preserved if (say) twenty years (or any number of years) were added to these two dates. If V_a in year 1 is preferred to V_b in year 3, V_b in year 21 should be preferred to V_b in year 23. However, Thaler and Sheffrin (1981) report that individuals often alter their preference as a function of the time the choice is made (even when the delay between

³ With this advice, governments have tended to rely on a single discount rate to discount exponentially (see Henderson and Bateman 1995 for exceptions to this rule).

the two sums is held constant, e.g. 3 years).⁴ Even when individuals face the same choice (viewing the choice at different points in the future), there is evidence of preference reversal.

Ainslie (1991) argues that individuals do not discount exponentially. Assessments are based on a hyperbolic curve that is more convex to the origin than an exponential curve. Individuals change their choices over the same prospect when the time span to the availability of a good changes. Individuals have a high time preference for the near future and a lower time preference for events that will take place later in time.⁵

Turning to the *rate* at which individuals discount future costs and benefits, traditional cost-benefit analysis usually relies on *one* rate of discount for costs and for benefits. Insights from behavioural economics indicate that individuals rely on different rates of discount for gains and for losses (e.g. Thaler, 1981; Loewenstein, 1987; and Frederick et al., 2002). The valence of outcomes is important. Discount rates for losses are usually far smaller than discount rates for gains (e.g. Thaler, 1981). One explanation is based on the disutility individuals experience if they ‘dread’ the future (Loewenstein, 1987). When this is the case, individuals do not discount future

⁴ For example, a majority of individuals preferred £50 immediately to £100 in two years but almost no one prefers £50 in four years to £100 in six years.

⁵ There are a number of specific hyperbolic forms for discount functions but for a single good valuation (V), Ainslie advocated using the following formula:

$$(1) \quad V = A/\xi + \Gamma(T-t)$$

where A is the amount involved, T is the time at which each amount is available and t is the time of the behaviour that obtains it, so that (T-t) is the delay for A. The term ξ is an empirical constant that determines the value of zero delay and Γ is an empirical constant that modifies the steepness of the delay gradient. Empirically both ξ and $\Gamma \cong 1$, so the formula simplifies to:

$$(2) \quad V = A/1 + 1(T-t)$$

For example, if the delay is 3 units of time and A is 1 then $V = 1/4$. If $V_a = 1$ and $V_b = 2$ and V_a and V_b are always separated by three units of time then, when V_a is available now it is preferred (as $V_a = 1$ and $V_b = 0.5$). Consider what happens if you add a 5-year delay to V_a and V_b . V_a is now $1/1+5 = 1/6$ and V_b is $2/1+8 = 2/9$ and is therefore preferred to V_a . As time increases, preference for V_a passes through indifference to V_b to a preference for V_b .

losses as heavily as future gains. They prefer to get losses ‘out of the way’ as soon as possible.

Insights from behavioural economics also question reliance on the same discount rate when assessing the present value of investment in different *domains*, e.g. Chapman (1996) compares discount rates in financial and health scenarios. Goodin (1982) argues that individuals rely on different discount rates in different domains because they find it difficult to attach monetary values to non-tradables.⁶ There is also the question of whether CBA should rely on the same discount rate for *every* period in the future (see Her Majesty’s Treasury, 2003 for recommendations in the UK).

When reflecting on the relevance of these insights from behavioural economics, Robinson and Hammitt 2011, p. 25) argue that “...in choosing a discount rate or set of rates, as well as a functional form...analysts must be clear about what, conceptually, they intend to represent for review by decision makers”.

16.3.3 Other-Regarding Preferences

In neoclassical economics, cost-benefit analysis focuses on *efficiency* as separate from any consideration of distributional *equity*. Is this still possible if there is evidence of bounded self-interest? With bounded self-interest, individuals’ preferences are already influenced by *pure altruism*, or by *reciprocity* (individuals’ willingness to reward, or to punish others, as a response to their perception of the way that they have been treated by others). In this scenario it is difficult to separate the influence of other-regarding preferences, e.g. it is difficult to separate the influence of altruism because “...altruistic values are typically not quantified when valuing non-market goods...” (Robinson and Hammitt, 2011, p. 27). More extensive information

⁶ He recommends reliance on a *restricted* form of opportunity cost discounting (changes in non-tradables should be compared with future changes in the same good - a ‘tree life’ today should be compared to ‘tree lives’ in the future).

about other-regarding preferences is required because *these* considerations are likely to influence the interpretation of a positive net present value of a project. If altruism varies with outcome (e.g. greater for health than other aspects of well-being), or if it depends on the individuals affected (e.g. greater for the poor than for the wealthy), altruism is likely to influence whether the net present value of a project will be positive, or negative.

Insights from behavioural economics also highlight the relevance of *relative* income. Frank and Sunstein (2001) focus on the implications (for CBA) of evidence that individuals are motivated by positional concerns. They question the relevance of estimates of WTP if individuals are asked how much they are willing to pay in isolation. If an individual believes that she is acting in isolation, she will also be concerned that her willingness to pay for the benefits derived from a public expenditure project (e.g. an increase in health, or personal safety) will reduce her relative income. Her willingness to pay will be lower than the willingness to pay that she would express if it was clear that the requirement to pay for the project would be the same for all individuals.

An assessment: The overarching problem is how to incorporate evidence that individuals' preferences are likely to be sensitive to cognitive biases and to context endogeneity. With reference to recent research into happiness (life satisfaction), it has been argued that preferences based on self-reported well-being (SWB) may be more informative than preferences based on WTP (e.g., Kahneman and Sugden, 2005). By comparison, Viscusi and Gayer (2016) question 'open-ended justifications' (p.87) when using narrow insights from behavioural economics (e.g. in laboratory experiments of specific populations) to adjust assessments of the benefits (in a CBA)

that will be experienced by a broader population. Referring to ‘behavioral transfer’ as “...the practice of applying results from a behavioral study in one context to a broader application of policy” (p.72), the authors call for “...formal guidelines for behavioural transfer practices” (p.88).

Shogren and Thunström (2016) suggest a different response. A CBA should report a range of benefits (an interval) that encompasses measures of benefits derived from the rational choice model and from behavioural models. If the range of benefits exceeds costs, decision-makers are able to proceed with confidence, but if costs are within the ‘benefit interval’ more discussion is required. Bernheim (2016) suggests a more comprehensive unified approach. The welfare effects of an individual’s choice should be explored with reference to each possible decision frame.

With growing consensus that it is no longer possible to rely on the assumption that individuals’ preferences are premised on rational self-interest, cost-benefit analysis faces the challenge of how it should embrace the insights delivered by behavioural economics.

16.4 Insights from Behavioural Economics: Implications for Taxation Policy

When applying ‘economics’ to taxation the question that usually pre-occupies analysts is how different taxes and different tax structures can be assessed – what would ‘good’ ones look like? Historically Adam Smith provided a set of criteria for such assessment which are known as Smith’s ‘canons’ of taxation. Smith (1776) argued that a good tax should satisfy four criteria:

1. *Equity*: Individuals ought to contribute “as nearly as possible in proportion to their respective abilities” (Smith 1776, p. 310). That a tax should be equitable

brings into consideration definitions of ‘ability to pay’ and appropriate tax progressivity;

2. *Certainty*: tax liabilities should not be arbitrary or uncertain. That is taxes should be formulated so that taxpayers are certain of how much they have to pay and when they have to pay it. This brings into consideration questions of tax simplicity, visibility (salience) and taxpayer compliance costs;
3. *Convenience*: The manner and timing of tax payment should be convenient to the taxpayer. This brings into consideration the method and frequency of paying taxes, e.g. most UK workers will be taxed on their earning automatically as part of the PAYE system;
4. *Economy or efficiency*: The excess burdens or welfare costs of taxation should be minimised. Included in this is the notion that taxes should not be expensive to administer and the greatest possible proportion should accrue as net government revenue. Also included under this would be the administrative, collection and psychic compliance costs of taxation. For further elaboration see Sandford, Godwin and Hardwick (1989).

Subsequently, economists have considered other criteria:

5. Taxes, if the most suitable mechanism, can be *externality correctors* as in the classic Pigovian tax case;
6. Taxes should facilitate *macro fiscal policy* via a role in economic stabilisation;
7. *Low marginal costs of additional policy delivery*. Once a tax system has been put in place then a sophisticated administrative and data handling capacity has been created. Its existence may facilitate other public sector policies that require administrative and data handling capacity but are not strictly about

raising tax. It may be that a least-cost delivery mechanism for such a policy is to do it via the tax system. An example concerning the provision of US health insurance is provided below.

With so many criteria, and the list could be extended, it would not be surprising that they will sometimes conflict. For example, an equitable tax system may be necessarily a complex one. Until relatively recently the analytical framework in which to couch the considerations noted above was uncontroversial, being that of neoclassical economics. With the advent of behavioural economics this has now changed, making the picture much more complicated and familiar ‘optimal’ solution recipes much less secure. While, as yet, there seems to be no synthesis of behavioural insights on taxation economics, there are plenty of leads to follow up (see, for example, McCaffery and Slemrod, 2006). Some of those leads are illustrated below.

16.4.1 Equity

Framing is one of the characteristics of a behavioural analysis and this can show up in attitudes as to what is deemed as equitable. The tax table can be constructed differently with reference to different default cases. The default is usually a childless family but the tax table could be described with reference, say, to a two-child family. With a childless family as the default the tax difference between a childless family and a two-child family is framed as a tax *exemption* (e.g., £1000 deduction from gross income for each child irrespective of family income level). With the default as a two-child family tax for the childless family would be framed as paying a *tax premium* – extra tax.

Schelling (1981) argues that this difference is important when explaining preference for government intervention. The same tax table is perceived quite differently depending on whether tax arrangements are perceived as a 'loss' or as a 'gain'. When discussing tax premiums and tax exemptions, students' views were sensitive to these perceptions. Schelling tried to sell the generally unpalatable argument that the rich should get a larger tax exemption for their children than the poor, because for example, they spend more on the bringing up of their children. He reported that students rejected the idea of granting the rich a larger child exemption (in adjusting from gross to taxable income) than the poor in the first frame (when the default was the childless family). The taxable income difference should not, in the students' view, be larger for the rich family than the poor family. However, the default could be the two-child family when the code now needs adjusting for those families without children. A childless premium could now be introduced by, say, cancelling a £1000 exemption for a family with a single child and £2000 exemption for a family without children. In raising the taxable income for the childless should the rise still be the same for the poor and the rich or should an exemption greater than £2000 be cancelled for the childless rich? When considering this question in the second frame (when the default was the two-child family) views favoured a larger tax premium on the childless rich than on the childless poor (they preferred that the taxable income difference should be larger for the rich family than for the poor family in direct contradiction to what was established under the initial default of childlessness). In one scenario the rich with children should, for tax purposes, be treated the same as the poor with children but in the other the rich without children should pay more tax than the poor without children but all that has happened is that

the same income tax has been reformulated. Views of equity seem 'frame' dependent and as such open to manipulation.

16.4.2 Tax certainty

One of the issues under this heading is the question of tax simplicity. But is there a case for tax complexity? Solving asymmetric information problems are a staple part of any microeconomics course. One solution is to get individuals to voluntarily signal their 'private knowledge' of their type. Typically, a cost is involved in completing a test of some form such that it is only for the most productive type that there will be an overall positive payoff to incurring that cost. Congdon, Kling and Mullainathan (2009) provide an example. Suppose there are externalities associated with higher education but they attach to only the ablest (high IQ) type of potential graduate. A tax subsidy to higher education might thus be justified to internalise this externality but it would only be for the ablest type. How might you be sure that only the ablest make use of a tax subsidy to education? If the tax subsidy is simple and transparent then all would-be graduates will avail themselves of the subsidy. If, however the tax code is complex and dense it will only be the able ones who pass the 'test' of researching the subsidy and therefore apply to receive it. A complex tax system could be an efficient screening device but it would remain to be shown it was a least-cost screening device.

16.4.3 Convenience and low marginal costs of additional policy delivery

A feature of most tax systems is their 'automaticity' which is convenient to most taxpayers so that compliance costs are very low for the majority for most tax payers. Congdon, Kling and Mullainathan (2009) combine this feature with the low marginal cost of additional policy delivery to provide a case for tax system provision of a

strictly unrelated public policy. Redistributive public policy typically requires an application process involving a 'means test' for qualification. For actors with bounded rationality the costs of understanding the qualifying conditions, filling in the forms and submitting the application loom so large that they fail to take up benefits that they are entitled to. It is claimed the poor exhibit more judgemental biases and self control problems so that they differentially procrastinate and yet they are the targets of many policies. In a 'behavioural' world 'take up' is endogenous to the method of delivery. One of Congdon, Kling and Mullainathan (2009) examples is the possible provision of health insurance in the USA. They note that while 21% of children eligible for Medicaid, or other similar help, remain uninsured, approximately 90% of those children live in families that file a federal income tax return. Given that much of the information that is required to determine Medicaid eligibility is on the tax return the suggestion is that the processes should be integrated to increase 'take up'.

16.4.4 Economy or efficiency

A great deal of economics of taxation is devoted to the welfare costs of taxation which are measured with reference to an assumed stable individual preference map. If this assumed stability is called into question, then so are measures based on this assumption. This issue was illustrated in the previous section. Here, however, the focus is one of the big areas where the insights of behavioural economics are to be found, namely, tax evasion. This affects both net government revenue and the administrative, collection and psychological compliance costs of taxation. In Allingham and Sandmo's (1972) 'standard' tax evasion (as crime) model predictions rely on Von-Neuman and Morgenstern indifference curves, detection probabilities and associated fines for evasion. While this model is a 'corner stone' for analysis of tax

evasion there are also some well known limitations. One of which is that given the likely values of parameters in the model it predicts much more tax evasion than appears to be observed. Explaining this has proved fertile ground for the behavioural analyst. Weber, Fookien and Herrmann (2014, p. 25-27) provide a convenient list of possible mechanisms though which three characteristics of the behavioural actor are deemed relevant to increased tax compliance: cognitive limitations and bounded self-interest (see: Table 2 which adapts their Table 3; Concept 3 reflects what Alm (2014) calls ‘group motivations’).

Table 2: Behavioural Concepts and Increased Tax Compliance

CONCEPT	MECHANISM	TRIGGER
1. Cognitive biases (working through detection and audit probabilities and risk aversion)	Overestimating small probabilities	Part of prospect theory (see decision weights at section 5.4 below)
	Increasing perceived probabilities	Both threat- of-audit letters and face to face contact with a customs official
	Ambiguity aversion	Ambiguous (unknown) audit rates
	Framing effects	Framing tax as ‘gains’ encourages risk aversion and compliance (prospect theory)
2. Concern about ‘self’ (internal dimensions)	Intrinsic motivation	‘Virtue is its own reward’
	Moral costs	Letters appealing to moral obligation have a muted positive impact
	Guilt costs	Tax amnesties allow ‘confession’ and guilt reduction
3. Concern about others (social dimensions)	Wider psychological costs of non-compliance	Emotions and public exposure – ‘stigma’ Redemption for shamed non-compliers
	Social norms of compliance	Letters indicating the majority have already paid their tax
	Fair tax system	Tax system seen as equitable
	Tax morale	Linked to perceived quality of institutions, democratic decision making and respect for the taxpayer

Source: Adapted from Weber, Fookien and Herrmann (2014, p. 25-27).

If tax analysis is limited to 'homo economicus' it would seem to leave a lot of potential explanatory power about tax compliance and the like completely untapped.

16.4.5 Taxation and market correction (externalities)

An area of economics where externality analysis looms large is environmental economics. Such is the importance of this literature a section is devoted to it below.

16.4.6 The tax system and fiscal policy

In the simplest macroeconomic models, the multiplier effect on the economy from stimulating aggregate demand is $1/1-c$ where c ($0 \leq c \leq 1$) is the marginal propensity to consume (*mpc*) out of additional income. Early work by Thaler and Shefrin (1981) and Shefrin and Thaler (1988) revealed that individuals have very different *mpcs* depending on how the additional income was assigned to different mental accounts. In their model 'current income', 'current wealth' and 'future wealth' are characterised by successively lower *mpc* values. It suggests, for example, where a tax refund is due to be paid to an individual its form will affect whether it is likely to be spent or saved (see Beverly, Schneider and Tufano, 2006). Shefrin and Thaler predict that if the tax refund is seen as a bonus then there will be a lower *mpc* observed than if it was seen as simply returned income. It provides a mechanism through which saving can be encouraged. In the USA since 2007 individuals' due refunds have been able to spread them across several accounts including saving accounts.

An assessment: Measures of the welfare costs of taxation loom large in neoclassical public sector economics but once preference stability is lost estimating

areas under real income constant demand curves becomes problematic as witnessed by the discussion of the previous section. The benefit of losing the theoretical and empirical precision of neoclassical public sector economics seems to be a much more nuanced discussion of the principles of a good tax system that may have much more to offer actual public policy. Sophisticated optimal income tax models often have predictions that seem at odds with policies that are likely to be implemented. For example, it can be shown that the marginal tax rate on the highest income earner should be zero as it allows that individual the same welfare level and increases their tax payment (see Cullis and Jones (2009) for an introduction to this literature). However, such a policy prescription is unlikely to be adopted.

16.5 Insights from Behavioural Economics: Implications for Environmental Policy

Although, the effectiveness of environmental policy instruments has long been based mainly upon theoretical inputs provided by standard rational choice theory, behavioural economics has recently attracted the attention of environmental economists. Indeed, there seems to be an increasingly strong consensus in the economics community that behavioural economics can help to understand why people do not respond to environmental policy measures as predicted by rational choice theory. In addition, understanding the motives and driving forces behind pro-social, pro-environmental and cooperative behaviour may help improve environmental policy design (see e.g., Daskalakis, 2016). A review of the literature recognizes at least five different areas where insights from behavioural economics may have implications for environmental policy. These are summarized in Table 3 and are discussed below.

Table 3: Behavioural anomalies compared with the axioms of rational (expected) utility maximization

Environmental Issue	Bounded Rationality	Bounded Self-Interest	Bounded Will-power
1. Conflict and cooperation in environmental policy		Social norms Self-image Social approval Status concern Reciprocity Fairness	
2. Use of market-based instruments		Intrinsic motivation	
3. Use of CBA	Context-endogenous /dependent preferences (through e.g. <i>framing</i> and <i>endowment effects</i>), and time inconsistent preferences (through e.g. <i>preference reversals</i>)		Time inconsistent preferences (through e.g. <i>present-biased preferences</i>)
4. Choice under risk	Risk misperception and ambiguity aversion		
5. Inertia in individual behaviour	<i>Status quo</i> bias or role of defaults		

16.5.1 Conflict and cooperation in environmental policy

Many environmental goods and services are public goods and policy makers aim to take collective actions to guarantee an efficient allocation/production of these goods. Examples are land use, water pollution, car emissions and global climate change. Standard utility maximization theory assumes that behaviour is motivated solely by their material payoffs and that people free ride when it is in their material self-interest to do so. Behavioural economics suggests that other-regarding preferences (coming from *bounded self-interest*) such as social preferences (e.g., social norms, reciprocity and fairness) and self-identity concerns (e.g., social

approval, and self-image) can influence human decisions. Several studies have examined the role of other-regarding theories on human behaviour and a common result in the literature is that people contribute to the provision of public goods to a significant extent. Some studies support the idea that fairness motives or inequality aversion affect people's voluntary contribution to public goods (see e.g. Fehr and Schmidt, 1999). Others find that reciprocal preferences - the subjects' desire to reward good intentions with good deeds (*positive reciprocity*) and bad intentions with bad deeds (*negative reciprocity*) - are crucial for the provision of public goods (see e.g., Fehr and Gächter, 2000a, 2000b). Altruistic preferences may also matter for the provision of public goods as individuals not only tend to take into account the others well-being (*pure altruism*), but may also "...experience a warm glow from having done their bit" (*impure altruism*) (Andreoni, 1989, p. 1448). There is also substantial evidence in the literature that 'others' and 'other's behaviour' matter (see e.g. Fischbacher et al., 2001; and Fischbacher and Gächter, 2006). People conform to social norms, imitate, compare with and learn from others, and care about their reputation, and self-image. How can these results be generalized to environmental economics?

Most of the literature on international agreements is based on the assumption that each negotiating country cares solely about its own material payoff. International environmental treaties (such as the Kyoto Protocol) generally suffer from weak enforcement and non-binding voting rules. Therefore, under rational game theory, free riding should be the dominant strategy (see Shogren and Tylor, 2008). The literature on reciprocal behaviour suggests, for example, that 'the self-enforced rules' like punishment, represent the dominant strategy to reduce free riding, increase cooperation and greater social efficiency, even when this represents a cost for the

‘willing punishers’ (see e.g. Fehr and Gächter, 2000a). Thus, policy makers should take into account these kinds of behaviour to promote an optimal level of provision of environmental goods via collective action (Omstrom, 1998). The behavioural-environmental literature on the effect of other-regarding theories on environmental issues is limited but growing rapidly. Efforts have been already made to show the extent to which fairness affects environmental coalitions and cooperation in international climate change policy and the siting of nuclear waste (see e.g. Oberholzer-Gee et al., 1997 for the latter; and Lange et al., 2010 for the former). There is also evidence that the role of self-image and social pressure may affect individuals’ willingness to recycle (see e.g. Brekke et al., 2007; and Czajkowski et al., 2015) and conserve energy (for an overview see Baddeley, 2011). Although generalizing insights from behavioural economics may not be straightforward (especially when this means generalizing them from an individual level to a multi-country negotiation level), some of them can be generalized at least qualitatively (Carlsson and Johansson-Stenman, 2012). First, individuals and countries are able to make decisions that are not only based on their own material payoff. This may explain why people tend to recycle on a voluntary basis, or why under certain conditions (such as *small groups*, the possibility of introducing *punishments* or *sanctions*, increasing *interaction* and *communication*, and *conditional cooperation*) people and countries may spontaneously manage common goods. Second, individuals and countries are likely to free ride unless appropriate policy instruments are applied, implying that behavioural economics reinforces conventional environmental economics rather than making it redundant.

16.5.2 Use of market-based policy instruments

Environmental economics has traditionally been focused on developing solutions to market failures. Market failures are typically associated with externalities, public goods, and asymmetric information. Economists refer to these sources of economic inefficiency to design and evaluate public policies for environmental sustainability, which include command and control regulation (i.e., emission standards) as well as market-based instruments (i.e., Pigovian taxes, tradable permits, fines and subsidies (see criterion 5. of Section 4 above)), with the latter generally considered superior to the former.⁷

As noted the standard model of environmental regulation assumes that individuals make consistent decisions on the basis of profit maximization and their material self-interest. However, behavioural economics provides evidence of systematic deviations from rational choice theory and one aspect of this is that people may be intrinsically motivated to contribute to a better environment even in the absence of external regulation. A large number of papers in the literature emphasize the role of intrinsic motivation (reflecting *bounded self-interest*) in individual decision making and more importantly its interaction with external regulation. Understanding the interaction between intrinsic motivation and monetary incentives (such as taxes, subsidies, and tradable permits) can be in fact of crucial importance for successful policy implementation as individuals' morale and motivation can render certain policies more effective (i.e., *crowding-in*) and others less effective (*crowding-out*).⁸ The effect of external incentives on individuals' intrinsic motivation has been

⁷ Compared to command and control instruments, market based instruments are more cost-effective – i.e., if properly designed and implemented, market-based instruments allow any desired level of pollution cleanup to be realized with the least expensive abatement activities and with no need for the government to have information on how to achieve such cost efficiency.

⁸ In particular, cognitive evaluation theory (see Deci, 1975; and Deci and Ryan, 1985) suggests that monetary incentives crowd-out moral motivation if and only if they are perceived as *controlling*. However, if individuals perceive external interventions as *acknowledging* their intrinsic motivation may increase.

analyzed in many different contexts and areas of research (for an overview see Gneezy et al., 2011). However, there is little empirical evidence in the environmental literature documenting the existence and implications of intrinsic motivation and its interaction with market-based instruments. Analysing households' perceptions of recycling activities, Berglund (2006) finds that moral motives significantly lower the costs associated with household recycling efforts. Similarly, investigating the reasons behind households' participation in green electricity programmes, Clark et al. (2003) find that high intrinsic motivation may explain early adoption of green electricity. Feldman and Perez (2009) show how the design of different legal instruments (e.g., deposit, mandatory scheme and voluntary contribution) affect people's motivation to engage in private enforcement to reduce pollution. An increasing number of papers acknowledge the role of intrinsic motivation in the form of environmental morale⁹ as a driving force for pro-environmental behaviours (see e.g., Frey, 1997; Frey and Stutzer, 2006; and Torgler et al., 2009). In this context, Barile et al. (2015) show that the relative efficacy of certain policy instruments depends on the extent to which individuals are motivated by 'environmental morale'. Taken together, what can be learned from behavioural-environmental economics is that market-based instruments may sometimes be inferior to control and command policies especially when external interventions are counter-productive. As suggested by Carlsson and Johansson-Stenman (2012, p. 84) "crowding effects sometimes make such instruments slightly more attractive and sometimes make such instruments slightly less attractive."

16.5.3 Use of cost-benefit analysis (CBA)

As discussed above (see Section 3), one of the lessons to be learned from

⁹ Environmental morale is generally referred to as the result of the aggregation of internalized norms and intrinsic motivation (Frey, 1997; and Frey and Stutzer, 2006).

behavioural economics is that people's behaviour and preferences are context dependent (reflecting *bounded rationality*). People are affected by the way in which choices are framed (*framing effect*) and are more eager to retain something that they already own than getting something new (*endowment effect*). People show inconsistent time preferences depending on the time the choices are made (i.e., preference reversals) and with choices being dominated by immediate gains (i.e., present-biased preferences). Context dependent and inconsistent time preferences play an important role in CBA in the areas of intertemporal choices and non-market environmental valuation. Most policy recommendations for global warming depend in fact on the choice of the discount rate (see e.g., Stern, 2007) and contingent valuation methods (CVM) are generally used to estimate how people value certain environmental goods in cost-benefit analysis. As discussed earlier, these findings represent a challenge to fundamental welfare theory and leave the debate about whether researchers should incorporate preference anomalies in cost-benefit analysis or overthrow the standard cost-benefit framework far from over.¹⁰

16.5.4 Choice under risk.

Given the nature the 'homo realitus' prospect theory (Kahneman and Tversky, 1979) is seen by many as a better guide to actual decision making under risk than the neoclassical standard expected utility theory. In prospect theory 'decision weights' replace probabilities and the 'value function' the standard utility function. With decision weights individuals overweight low probabilities and underweight high probabilities. The former will encourage risk aversity in the face of low probability

¹⁰ Some scholars e.g. tried to understand the impact of preference anomalies to the standard cost-benefit framework underlying the application of environmental instruments (see e.g., Hanley and Shogren, 2005; and, more recently, Robinson and Hammit, 2011). Some others (see Kahneman and Sudgen, 2005; and Howarth and Wilson, 2006) offer different approaches to the standard cost-benefit analysis.

environmental losses and risk taking for low probability environmental gains. The latter reduces the attraction of high probability environmental gains and reduces the threat of high probability environmental losses. Given the shape of the value function individuals are risk-averse for gains, risk seeking for losses and demonstrate loss aversion. An implication is that individuals overestimate low-probabilities/high-loss scenarios such as those found in environmental policy – e.g., climate shift in the Gulf Stream.¹¹ Further individuals are attracted by known probabilities and dislike unknown ones such that they make inconsistent choices. This so-called ambiguity aversion is demonstrated in the Ellsberg paradox (see Knight, 1921; and Camerer and Weber, 1992). (This is consistent with ambiguous (unknown) audit rates increasing tax compliance in Table 2.)

How can we use this information for policy implementation? Should we rely on the public's risk perception and 'frame' environmental cost and benefit information, use experts' risk perception or adopt other criteria? As suggested by Carlsson and Johansson-Stenman (2012, p. 88) "the issue of whose risk should ultimately count in public policy is not new" but views vary dramatically. Slovic's (2000) answer to this question is that risk is a social construction and whose definition of risk gets to count in policy is a reflection of political or other power (e.g. a claim to expertise). In the context of environmental policy, risk perception clearly has important consequences for CBA. Despite Slovic's deep concerns the government might prefer to rely on experts' risk judgments rather than those of the public. In fact, if CBA relies on people's valuation e.g. through contingent valuation, one can expect that this is likely to be biased in predictable ways such that individuals misestimate the monetary value of, say, reducing certain environmental risks. However, subjective perceived risk may

¹¹ Behavioural analyses reveal that people tend to overestimate the change of suffering from potentially bad outcomes with very low probability of realisation (i.e., people are loss averse). For a discussion see Shogren and Taylor (2008).

have important consequences for real welfare effects (*via* fears) and may induce people to change their behaviour. Therefore, it seems reasonable that governments care also about subjective risks and not only about what some see as objective risks (Carlsson and Johansson-Stenman, 2012). Unfortunately, the question of whether there exists a threshold to separate reasonable from unreasonable beliefs over risky events remains an unresolved dilemma (Shogren and Taylor, 2008).

16.5.5 Inertia in individual behaviour

The status quo bias or the role of defaults (reflecting *bounded rationality*) may explain why individuals and/or countries prefer the status quo situation and are reluctant to make changes. Given individuals' *inertia* and preference for the status quo, there exists an increasing number of papers in the literature testing the hypothesis that changing the default option may help in promoting environmentally friendly behaviours. In the context of green energy, Pichert and Katsikopoulou (2008) and, more recently, Loomer et al. (2013) find that green defaults significantly affect the choice of green energy. According to Sunstein and Reisch (2016, p.162) "default rules, and seemingly modest alterations to such rules, can have an exceedingly large impact on environmental quality – potentially larger than that of significant economic incentives or serious efforts toward moral suasion or environmental education." Again, there is not a general consensus over the use of defaults to change individuals' behaviour e.g. Löfgren et al. (2012) in a natural field experiment to test the role of default effects on the choice of CO₂ emissions offsets for air transport, find that the default has no significant effect on the decision to offset. However, as suggested by Venkatasubramanian (2008) the existence of the status quo bias may both directly and indirectly affect the efficiency of environmental policies. Thus policy-makers should

care about this behavioural anomaly when making ‘new’ environmental policies seeking efficiency in the provision of environmental goods.

An assessment: Although behavioural economics has recently attracted the attention of environmental economists, the explanatory power and the normative implications of behavioural economics are still under critical debate. Shogren and Taylor (2008, p. 13) argue that we are facing a “new behavioural-environmental second-best problem”. That is, given the presence of market failures (environmental externalities) and behavioural failures (e.g., bounded rationality), environmental policies need to be corrected for both imperfections as correcting one failure without correcting the other will actually reduce overall welfare. They conclude that (ibid, p. 16) “the evidence from behavioural economics remains insufficient to support the wholesale rejection of rational choice theory within environmental and resource economics”.

Similarly, Pasche (2016, p. 117) states that “the insights of behavioural economics cannot be translated immediately in an improved environmental policy. The social planner will be better informed now, but the institutional setting and the features of political mechanisms are still in place and will shape the decisions.”

16.6 Conclusion

Anomalies feature strongly in this chapter but Kahlil (2003) seems to suggest there are somehow too many of them: “The number of uncovered anomalies is as dizzying as the number of sub-atomic particles discovered by physicists.” (Khalil, 2003, p. 1). Furthermore, Wittman (1995, p. 54) notes: “... a collection of anomalies does not a theory make”.

Nobel economics laureate Simon (1979), in effect anticipating Wittman's criticism, comments: "Once a theory is well entrenched, it will survive many assaults of empirical evidence that purports to refute it unless an alternative theory, consistent with the evidence, stands ready to replace it." (Simon, 1979, p. 509).

Thaler (2016) considers the past, present and future of behavioural economics and offers his view on these matters. He asks the question: 'What do you want economic theory to do?' If you want it to be deductive and prescriptive then the neoclassical paradigm achieves that. However, if you want it to be deductive – evidence based – and predictive then a behavioural approach dominates. This latter kind of economics is not viewed as a 'paradigm shift' ('an alternative theory'), but rather a 'paradigm rediscovered' as Adam Smith, amongst other early economists, documents cornerstone behavioural traits: 'overconfidence'; 'loss aversion' and 'present bias'. There is no new grand design for economics to be found, as neoclassical economics fits that bill. What there is, however, is the 'engineering' of 'practical enhancements' to that standard theory to increase predictive accuracy. Thaler adds 'testable' to Rabin's (2013) phrase 'portable extensions to existing models' to encapsulate this process as 'portable, testable, extensions to existing models' (PTEEM). It will be this kind of economics that will become the new 'bog standard' economics and the prefix 'behavioural' will atrophy.

Does this chapter fit this picture? As suggested, it patently does not offer a fully articulated alternative theory of public sector economics to rival neoclassical prescriptions. However, on the evidence presented here, it does offer a plethora of examples and instances where bounded abilities, bounded self-will and preference endogeneity matter significantly for an inductive and predictive public sector economics. As such, the key elements in PTEEM seem to be clear. However, it also

seems clear that it is difficult, if not impossible, to unify the elements once you have lost the neoclassical anchors of exogenous preference stability and well-defined (budget) constraints. It seems that 'behavioural' public sector economics is necessarily more 'messy' than its elegant neoclassical counterpart. But this is not to say that it may be much more useful for public sector policy than 'clean' theory based on a 'wrong' caricature. The 'tedious, policy relevant, empirical public sector economist', whose seminar questions were an embarrassment to the department, is destined to become the new seminar 'hot shot'!

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